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PHOTOGRAPHS AND DESCRIPTIONS OF CUP-FUNGI—VIII. ELVELA INFULA AND GYROMITRA ESCULENTA

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(WITH PLATE 1)

There seems to be considerable confusion and diversity of opinion among students of Ascomycetes as to what constitute the real differences between[1] *Elvela infula* Schaeff. and *Gyromitra esculenta* (Pers.) Fries.

Schaeffer published two plates (159 and 160) in his illustrations of fungi which, although they received no specific names in the text, were labeled in the index *Elvela infula* and *Elvela Mitra* respectively, the latter being distinguished from the former by its more rugose hymenium. In 1800, Persoon, in his "Commentarius," retained the name *Elvela infula* in the same sense as used by Schaeffer, but *Elvela Mitra* was changed to *E. esculenta* since *E. Mitra* had been previously used by Linnaeus for an entirely different species.

In 1849 Fries established the genus *Gyromitra* on *Elvela esculenta*, this genus being distinguished from *Elvela* by the fact that the hymenium is gyrose with elevated ridges, essentially the same character used by Schaeffer in separating the species.

Rehm retained the genus *Gyromitra* for *Elvela esculenta* but also included *Elvela infula* in the genus, as had been previously done by Quélet, citing both plates (pp.) under each species, which would indicate, according to Rehm, that Schaeffer had mixed the

[1] The generic name has been variously spelled, *Elvela*, *Elvella*, and *Helvella*. In the present paper the original spelling is adopted.

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two species on both plates. If Rehm is correct in placing the two species in the same genus, there is no longer any reason for considering them specifically distinct since Fries used the same character in segregating the genus as had previously been used by Schaeffer in separating the species. *Gyromitra* can not then be regarded as a valid genus, since it was founded on a supposed difference which has been found to no longer exist.

Boudier retains the genus *Gyromitra,* but bases it on an entirely different character so as to exclude from the genus the very species on which it was founded. A new genus *Physomitra* is then proposed which includes the two species which he calls *Physomitra infula* and *Physomitra esculenta.* In his description of the last two species, there is a slight difference in the size of the spores, a difference, however, which had not been noted by previous authors.

While, to be sure, other differences have been pointed out by more recent authors in addition to those originally mentioned by Schaeffer and Fries, such as the shape of the pileus, the color, the attachment of the pileus to the stem, the inflation of the cap, etc., none of these characters appear to the writer to be any more fixed and reliable than the one originally mentioned. The type of the genus *Elvela* has the pileus more or less adnate to the stem, so that this character cannot be used as a distinguishing character between *Elvela* and *Gyromitra.* Even the original illustration of the type of the genus *Gyromitra* does not show the pileus completely attached to the stem at the margin, as might be inferred from many modern illustrations and descriptions. The inflation of the cap is a character which is common to both *Elvela infula* and *Gyromitra esculenta* and one which is most variable and misleading.

The difference in the rugosity or gyrosity of the hymenium might be accepted as a good specific and possibly generic character were it not for the fact that we often find all stages of gyrosity in specimens growing apparently from the same mycelium, and which we have no reason to believe do not represent the same species. It seems to the writer that it was a mistake to establish a genus on a character which is of very doubtful specific

value as was done in the case of *Gyromitra*. This is shown by the fact that no two modern writers seem to agree as to just what constitutes the difference between *Gyromitra esculenta* and *Elvela infula*.

In "Minnesota Helvellineae," Miss Hone lists *Elvela infula* but makes no mention of *Gyromitra esculenta*. She then appends an extended note explaining why she considers the Minnesota plant an *Elvela* instead of a *Gyromitra*, laying great stress on the absence of what she considers a true inflation of the cap, a character which has been ascribed to *Gyromitra* by Schroeter. Just what Schroeter would consider a true inflation of the cap is a question which mycologists seem unable to answer.

In the "Discomycetes of Wisconsin," Dodge lists *Elvela infula* but does not include *Gyromitra esculenta*. He apparently found no specimen in Wisconsin which would satisfy the requirements of *Gyromitra esculenta* as defined by modern authors.

The writer, in "Iowa Discomycetes," listed *Gyromitra esculenta*, but at that time knew nothing of *Elvela infula*. Yet the illustrations of the Minnesota and Iowa plants which have been placed in different genera might easily pass for the same species.

After a comparison of the above lists, the writer is convinced that the three authors are writing about the same plant but calling it by different names. Otherwise, why is it that the two species have never been reported from either of the three adjacent states which have such a close similarity in climate and natural conditions?

And European reports are equally puzzling. Rehm in his "Discomycetes of Europe" lists both *Gyromitra esculenta* and *G. infula*, but all of the exsiccati mentioned are included under the first. If the two forms are really distinct and both are represented in Europe, it seems strange that Rehm was unable to find any published exsiccati to illustrate the latter species.

After a careful examination of all the available facts, the writer is forced to conclude that *Gyromitra* is what some writers might call a traditional genus, having come down through literature and having been commonly accepted by mycologists but originally founded on a plant which cannot be specifically separated

from *Elvela infula*. The extreme variability of the species would readily account for all the different interpretations which have been assigned to the two supposed species by different mycologists. I therefore venture to combine the species and append a complete synonymy and description.

ELVELA INFULA Schaeff. Fung. Bavar. **4**: Ind. 105. 1774.

?*Phallus Monacella* Scop. Fl. Carn. ed. 2, **2**: 476. 1772.
Elvela Mitra Schaeff. Fung. Bavar. **4**: Ind. 105. 1774. Not *E. Mitra* L.
Elvela brunnea L. Syst. Nat. 1450. 1796.
Helvella esculenta Pers. Comm. Fung. Bavar. 64. 1800.
Elvela infula Pers. Syn. Fung. 617. 1801.
Gyromitra esculenta Fries, Summa Veg. Scand. 346. 1849.
Elvela rhodopus Krombh. Abbild. **3**: 23, 1834.
Gyromitra infula Quél. Ench. Fung. 272. 1886.
Gyromitra esculenta crispa Peck, Ann. Rep. N. Y. State Mus. **51**: 299. 1898.
Physomitra infula Boud. Hist. Class. Discom. Eu. 35. 1907.
Physomitra esculenta Boud. Hist. Class. Discom. Eu. 35. 1907.

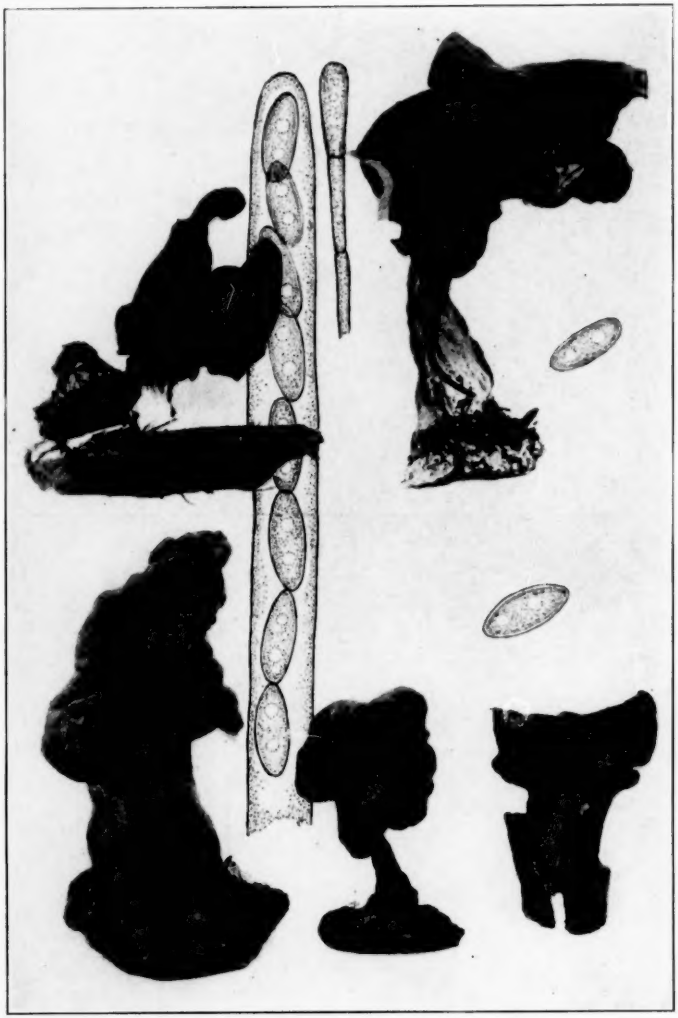
Pileus reaching a diameter of 6–8 cm., reflexed and more or less adnate to the stem, very irregular, mitrate, saddle-shaped or occasionally subglobose, even or variously contorted or convoluted, the color varying from reddish-brown to dark-brown and occasionally almost black; stem reaching a length of 6–8 cm. and a diameter of 5–15 mm.; even or more or less lacunose, never strongly fluted, the color varying from whitish to yellowish or occasionally with a pinkish tint; asci cylindric or subcylindric, reaching a length of 200 μ and a diameter of 12–14 μ, 8-spored; spores 1-seriate or partially 2-seriate, rather narrow-ellipsoid, containing two oil-drops, about 8–12 $\times$ 18–24 μ; paraphyses strongly enlarged at their apices, reaching a diameter of 10 μ.

On the ground or occasionally on rotton wood.

TYPE LOCALITY: *Europe*.

DISTRIBUTION: Maine to British Columbia and California.

ILLUSTRATIONS: Schaeff. Fung. Bavar. **4**: *pl. 159, 161;* Rab. Krypt.-Fl. **1**[3]: 1174; *f. 1–3;* Boud. Ic. Myc. *pl. 223, 224;* Pers. Champ. Comest. *pl. 4;* Cooke, Hand. Brit. Fungi **2**: 657, *f. 322;*



ELVELA INFULA SCHAEFF.

Cooke, Mycographia *pl. 89, f. 328* and *pl. 90, f. 330;* Gill. Champ. Fr. Discom., *pl. 19;* Massee, Brit. Fungus. Fl. **4**: 188, *f. 14;* Phill. Brit. Discom. *pl. 1, f. 2;* E. & P. Nat. Pfl. **1**[1]: 44, *f. 141B;* Fries, Sv. Aetl. Svamp. *pl. 82 and 83;* Krombh. Abbild. *pl. 20, f. 6–12* and *pl. 21, f. 12–17;* Minn. Bot. Studies **3**: *pl. 3, f. 1–3.*

EXSICCATI: N. Am. Fungi 1267; Clements. Crypt. Form. Colo. *141.*

NEW YORK BOTANICAL GARDEN.

EXPLANATION OF PLATE 1

Several plants photographed from dried specimens and about one-half natural size. The spores, ascus, and paraphysis were drawn with the aid of the camera lucida with a one-inch eye-piece and a one-sixth objective. The lower figure is the type of *E. oregonensis.*

CORRECTIONS AND ADDITIONS TO THE POLYPORES OF TEMPERATE NORTH AMERICA

WILLIAM A. MURRILL

During the dozen years or more that have elapsed since the publication of the two parts of *North American Flora* dealing with polypores, much additional information has been gained that is of value in determining the limitations and distribution of species, as well as the history and nomenclature of type collections. This knowledge has come to me through recent American collections in widely separated regions; through more and better specimens obtained from Europe; and through the increased knowledge and more enlightened opinions of other students of the family.

When I undertook the study of polypores, at the suggestion of Dr. Underwood, American collections were in very bad shape, and I afterwards found that European collections were not much better. This was particularly true of American specimens in European herbaria, because few foreign workers took any special interest in them, and they were incorrectly determined and carelessly handled. Through the valued assistance of American and European mycologists, our knowledge of these plants in America is now fairly accurate and complete, so far as the pileate forms are concerned, and I hope that the same may soon be said of the resupinate species.

The notes I have to make at this time deal largely with the nomenclature of temperate species already recognized, and with the addition of new species to our flora. The former will be taken up in the order in which they appear in *North American Flora;* while the latter will be appended in an alphabetical list of species, regardless of generic or other grouping.

HYDNOPORIA FUSCESCENS (Schw.) Murrill

Change to *Hydnochaete olivacea* (Schw.) Banker, as published in Mycologia **6**: 234. 1914. This species remains in the Polyporaceae.

FOMITIPORIA DRYOPHILA Murrill

Probably not distinct from *Pyropolyporus Calkinsii* Murrill.

CORIOLUS HIRSUTULUS (Schw.) Murrill.

Only a form of *Coriolus versicolor* (L.) Quél.

CORIOLUS PUBESCENS (Schum.) Murrill

Add to synonymy *P. Grayii* Cooke.

CORIOLUS BALSAMEUS (Peck) Murrill

This species has been recombined as *Tyromyces balsameus* (Peck) Murrill.

CORIOLUS LLOYDII Murrill

This may be only a form of the variable *Coriolus pubescens* (Schum.) Murrill.

CORIOLUS PINSITUS (Fries) Pat.

Add to synonymy *Boletus villosus* Sw. Prodr. 148. 1788. Not *B. villosus* Huds.

CORIOLUS BIFORMIS Murrill

Polyporus biformis Klotzsch having been wrongly interpreted. *Coriolus molliusculus* (Berk.) Murrill was adopted in "Northern Polypores" for this species. According to Bresadola, who has sent me excellent specimens to support his opinion, *Trametes populina* (Schulz.) Bres. is not distinct from *C. molliusculus*. If true, then his name would have priority unless the doubtful *Boletus cervinus* Schw. could be shown to be the same thing.

CORIOLUS PROLIFICANS (Fries) Murrill

Change to *Coriolus biformis* (Klotzsch) Pat. (*Polyporus biformis* Klotzsch, Linnaea **8**: 486. 1833).

CORIOLELLUS SEPIUM (Berk.) Murrill

Add to synonymy *Trametes minima,* a manuscript name of Berkeley's recently published for the small, undeveloped form so common on oak, chestnut, etc.

TYROMYCES GUTTULATUS (Peck) Murrill

According to Bresadola, this is not distinct from *Polyporus alutaceus* Fries.

TYROMYCES SMALLII Murrill

Polyporus pini-ponderosae Long, recently described from New Mexico, does not appear to be distinct.

TYROMYCES TILIOPHILA Murrill

Although of large size and found on hardwood, this species should be carefully compared with *T. guttulatus* (Peck) Murrill and *Polyporus alutaceus* Fries.

TYROMYCES CRISPELLUS (Peck) Murrill

A synonym of *T. balsameus* (Peck) Murrill, as stated in Jour. N. Y. Bot. Gard. **13**: 177. 1912.

SPONGIPELLIS GALACTINUS (Berk.) Pat.

I have seen no specimens from America that correspond to *Spongipellis spumeus* of Europe. *Trametes malicola* Berk. & Curt. is said to be distinct from *S. galactinus,* under which I doubtfully placed it as a synonym.

BJERKANDERA PUBERULA (Berk. & Curt.) Murrill

Not sufficiently distinct from *B. fumosa* (Pers.) P. Karst.

HEXAGONA ALVEOLARIS (DC.) Murrill

Add to synonymy *Favolus Kauffmanii* and *Favolus Whetstoneae,* both published by Lloyd in Myc. Notes 44: 1916.

HEXAGONA STRIATULA (Ellis & Ev.) Murrill

This may be only a variety of *H. alveolaris* (DC.) Murrill.

MICROPORELLUS DEALBUTUS (Berk. & Curt.) Murrill

I found a plant in North Carolina and I also have one from Auburn, Alabama, collected by Earle and Baker, which appear to be quite distinct from the one usually called *M. dealbata*. It is claimed that there has been some mistake at Kew and that this thicker plant, often with central stipe, should be called *Polyporus dealbatus* and the more common one *P. mutabilis*. If this is true, it would necessitate not only a change of name but also a change in my generic treatment.

POLYPORUS CRATERELLUS Berk. & Curt.

It is probable that *P. cyathiformis* Lév. is not distinct. If so, this name should be taken up. *P. confusus* Massee is a closely related species recently described from Louisiana.

POLYPORUS COLUMBIENSIS Berk.

This species occurs in Oregon rather than in South Carolina.

POLYPORUS HUMILIS Peck

Compare *Polyporus fractipes* Berk. & Curt.

POLYPORUS ARCULARIFORMIS Murrill

Only a small form of *P. arcularius* (Batsch) Fries.

POLYPORUS AMYGDALINUS Berk. & Rav.

An excellent specimen of this rather imperfectly known species was recently sent in from Montgomery, Alabama, by Dr. R. P. Burke. See list of additions.

SCUTIGER RETIPES (Underw.) Murrill

Apparently not distinct from specimens of *Polyporus pes-caprae* collected by Bresadola in Italy. It is reported from New Jersey and North Carolina, as well as from Alabama.

SCUTIGER HOLOCYANEUS (Atk.) Murrill

This can hardly be distinct from *S. caeruleoporus* (Peck) Murrill, although I have never been able to compare the types.

SCUTIGER RADICATUS (Schw.) Murrill

See "Western Polypores" for a descriptive account of *Scutiger hispidellus* (Peck) Murrill, which is distinct from *Scutiger radicatus*. It is claimed that *P. Kansensis* is also distinct, on the ground that it is different in habit and also has different spores.

SCUTIGER PERSICINUS (Berk. & Curt.) Murrill

Compare "Southern Polypores" for notes on a recent collection of this species.

SCUTIGER WHITEAE Murrill

This is the representative of *Polyporus confluens* (Alb. & Schw.) Fries in America. It is pale-colored when fresh, resembling *P. ovinus*, but turns reddish instead of gray in the herbarium. I have it from Tolland, Colorado; Banff, Canada; and Hague, New York; as well as from Maine.

GRIFOLA PORIPES (Fries) Murrill

Change to *Grifola cristata* (Schaeff.) S. F. Gray. Several collections received from Europe show that the American plant is not distinct. It was first described and figured by Schaeffer (Fung. Bavar. Ind. 81. *pl. 113.* 1774) under the name of *Boletus flabelliformis*, which he later changed to *Boletus cristatus* (Fung. Bavar. Ind. 93. *pl. 316, 317.* 1774). *Boletus flabelliformis* was used by Scopoli in 1770 for a different plant.

GRIFOLA SUMSTINEI Murrill

Change to **Grifola mesenterica** (Schaeff.) Murrill. Originally described as *Boletus mesentericus* by Schaeffer (Fung. Bavar. Ind. 91. *pl. 267.* 1774) and renamed *Boletus giganteus* by Persoon.

GRIFOLA FRONDOSA (Dicks.) S. F. Gray

Some claim that *Polyporus intybaceus* is distinct. Practically all the specimens so labeled, however, are *G. frondosa*.

GRIFOLA BERKELEYI (Fries) Murrill

Strange as it may seem, this oak-loving species grows on conifers in the west, attacking the roots of *Abies* and even occurring on dead fir wood. Dr. Weir has sent me specimens from Idaho and I have recently received a collection from Corvallis, Oregon, found by Mr. C. E. Owens at the base of a living *Abies grandis* on October 28. The surface of the western specimens is quite reticulate, but they do not appear to be specifically distinct.

GRIFOLA FRACTIPES (Berk. & Curt.) Murrill

This was changed to *Grifola Peckiana* (Cooke) Murrill in "Northern Polypores." *Polyporus fractipes* Berk. & Curt., described from South Carolina, appears to be a different thing, closely related to *P. humilis* Peck.

AURANTIPORUS PILOTAE (Schw.) Murrill

Change to **Aurantiporus croceus** (Pers.) Murrill (*Polyporus croceus* Pers. Obs. Myc. 1: 87. 1796). *Polyporus Pini-canadensis* Schw. can hardly be a synonym of this species.

LAETIPORUS SPECIOSUS (Batt.) Murrill

Change to **Laetiporus sulphureus** (Bull.) Murrill (*Boletus sulphureus* Bull. Herb. Fr. *pl. 429.* 1788). It has been decided that Battarra was a non-binomial author, although some of his names happened to be binomial in form.

FUNALIA VILLOSA (Sw.) Murrill

Change to *Funalia versatilis* (Berk.) Murrill. *Boletus villosus* Sw. is *Coriolus pinsitus* (Fries) Pat., but Swartz's name cannot be used because *B. villosus* Huds. is prior.

FUNALIA STUPPEA (Berk.) Murrill

According to specimens from Bresadola, *Trametes hispida* Bagl. and *Trametes Trogii subresupinata* are not distinct. According to Maire, the name *Trametes extenuata* (Mont.) Pat. is to be preferred. Roumeguère calls the same plant *Trametes hexagonoides* Fries.

HAPALOPILUS SUBLILACINUS (Ellis & Ev.) Murrill

Apparently not distinct from *Hapalopilus gilvus* (Schw.) Murrill.

HAPALOPILUS GILVUS (Schw.) Murrill

Polyporus Hookerii, a manuscript name of Berkeley's recently published, is synonymous. *Polyporus calvescens* Berk. is not a synonym. *Trametes Petersii* Berk. & Curt. is also very probably distinct.

INONOTUS HIRSUTUS (Scop.) Murrill

Polyporus Bankeri C. G. Lloyd is not distinct, according to Lloyd.

INONOTUS DRYOPHILUS (Berk.) Murrill

Said to be the same as *Polyporus rheades* Pers. (Myc. Eur. **2**: 69. 1825), found on trunks in France, and synonymous with or very closely related to *Polyporus coruscans* Fries and other European species.

INONOTUS PERPLEXUS (Peck) Murrill

Change to *Inonotus cuticularis* (Bull.) P. Karst. (*Boletus cuticularis* Bull. Herb. Fr. *pl. 462.* 1789).

INONOTUS AMPLECTENS Murrill

If the type of *Inonotus fruticum* (Berk. & Curt.) Murrill was collected on *Asimina,* then *I. amplectens* is probably not distinct from it.

INONOTUS RADIATUS (Sow.) P. Karst.

Polyporus glomeratus Peck is a distinct species.

COLTRICIA PERENNIS (L.) Murrill

Polyporus prolificans C. G. Lloyd is said to be a synonym.

COLTRICIA TOMENTOSA (Fries) Murrill

Regarding *Polyporus dualis,* Peck published the following:

"In Sylloge, Vol. vi, p. 208, this fungus has been united with *P. circinatus,* to which it is similar in color and texture, but from which it differs in its shape and habitat. It is dimidiate and stemless, or with only a lateral short stem-like base, and grows from the sides of stumps or dead trunks of spruce or pine trees. The dried specimens are also a little more highly colored than those of *P. circinatus.* It does not seem right to disregard entirely such differences, and I am unwilling to follow the plan of Sylloge in considering this plant identical with *P. circinatus.* It is at least worthy of varietal distinction, and may stand under the name *P. circinatus* Fr. var. *dualis* Pk."

COLTRICIA OBESA (Ellis & Ev.) Murrill

Change to **Coltricia Montagnei** (Fries) Murrill (*Polyporus Montagnei* Fries; Mont. Ann. Sci. Nat. II. **5**: 341. 1836).

CRYPTOPORUS VOLVATUS (Peck) Shear

In my "Northern Polypores" and "Western Polypores," Hubbard instead of Shear was incorrectly cited as the authority both for the generic name and the specific combination.

FOMES ROSEUS (Alb. & Schw.) Cooke

It is claimed by some that the plant called *Polyporus carneus* in this country is distinct, being thin and annual, while the true *Fomes roseus* is ungulate. Compare variations occurring in *Porodaedalea Pini* (Thore) Murrill.

PYROPOLYPORUS Murrill

Species of this genus having ferruginous or fulvous spores were transferred to the new genus, *Fulvifomes* Murrill, in "Northern Polypores," "Southern Polypores," "Western Polypores," and "Tropical Polypores."

PYROPOLYPORUS BAKERI Murrill

Specimens of *Fomes Hartigii* from Bresadola appear very similar on first sight, but are probably distinct. Compare also *Fomes robustus.*

PYROPOLYPORUS PRAERIMOSUS Murrill

Not specifically distinct from *Fulvifomes Everhartii* (Ellis & Gall.) Murrill.

PYROPOLYPORUS JUNIPERINUS (Schrenk) Murrill

Fomes Demidoffii is said to be the same thing. If so, this name will have to be taken up, since it is much older. According to Saccardo, *Fomes Demidoffii* Lév. occurs "ad truncos Juniperi excelsae in Europa et Pini silvestris pr. Minussink Sibiriae Asiaticae." The description agrees fairly well with that of *P. juniperinus*.

PYROPOLYORUS EARLEI Murrill

Not specifically distinct from *Fulvifomes juniperinus* (Schrenk) Murrill.

GLOBIFOMES GRAVEOLENS (Schw.) Murrill

Polyporus botryoides Lév. is probably not distinct.

ELFVINGIA P. Karst.

Species having hyaline or subhyaline spores were transferred to the new genus, *Elfvingiella* Murrill, in "Northern Polypores," "Southern Polypores," "Western Polypores," and "Tropical Polypores."

ELFVINGIA FASCIATA (Sw.) Murrill

The validity of the specific name is in doubt and it may be advisable to use the combination **Elfvingiella marmorata** (Berk. & Curt.) Murrill for this species.

ELFVINGIA MEGALOMA (Lév.) Murrill

Many authors prefer *Fomes applanatus* for this species, claiming that there is no specific difference between the American and European plants. The earliest name for *Fomes applanatus* is *Boletus lipsiensis* Batsch, 1786, and this was taken up in 1903 as *Elfvingia lipsiensis* (Batsch) Murrill.

GANODERMA SESSILE Murrill

The type of this species is large and entirely sessile, but a great many forms have been collected since it was described that are furnished with long stipes and seem to connect it up with *Polyporus lucidus* of Europe (*Ganoderma pseudoboletus* (Jacq.) Murrill). According to some authors, *Ganoderma subperforatum* Atk. is not distinct. The genus is a very difficult one and still requires considerable field work before the limitations of the species are accurately known.

DAEDALEA AESCULI (Schw.) Murrill

Use the name *Daedalea ambigua* Berk. for this species.

GLOEOPHYLLUM HIRSUTUM (Schaeff.) Murrill

Overholts includes *Trametes protracta* Fries as an American species, but says that some consider it only a poroid form of *G. hirsutum*, which it much resembles.

LIST OF ADDITIONS

ABRAMSIANUS. *Pyropolyporus Abramsianus* Murrill, Western Polypores 26. 1915. Collected several times in California.

ADUNCUS. *Polyporus aduncus* C. G. Lloyd, Letter No. 56: 5; Syn. Apus Pol. 354. 1915. Type not seen. Belongs in *Inonotus*.

"Pileus dimidiate, 1 cm. thick, unicolorous brown. Surface with coarse, brown, hispid hairs. Context brown. Pores small, round, brown. Setae few, large, 8–10 × 60–75 μ, deeply colored, with peculiar, hooked points. Spores hyaline, smooth, 4 × 5–6 μ, not guttulate. Spores are a little larger than Polyporus leporinus, but otherwise it is exactly the same, excepting the surface, which is quite different. It is very rare, only known from one specimen from E. K. Abbott, Monterey, California, and grew on the roots of a pine tree. To the eye it resembles Polyporus cuticularis, but has no relation to it otherwise."

AMARUS. *Fomes amarus* (Hedgcock) Murrill, Western Polypores 25. 1915. Found on incense cedar in Oregon and California.

AMORPHUS. *Tyromyces amorphus* (Fries) Murrill, Mycologia **10**: 109. *pl. 6, f. 5.* 1918. Rare on conifers in northern regions.

AMYGDALINUS. *Polyporus amygdalinus* Berk. & Rav.; Berk. Grevillea **1**: 49. 1872. Described from South Carolina, on oak, and poorly represented until Dr. R. P. Burke recently sent me splendid specimens from Alabama. They suggest *Laetiporus sulphureus,* but are not brilliantly colored and the context is very soft corky instead of rigid when dry.

ARCTOSTAPHYLI. *Fomes Arctostaphyli* Long. Compare depauperate forms of *Pyropolyporus igniarius.*

AURICULATUS. *Pseudofavolus auriculatus* Pat. Bull. Soc. Myc. Fr. **24**: 4. 1908. Described from Louisiana and said to resemble *Hexagona cucullata* (Mont.) Murrill.

BOREALIS. *Fomes borealis* C. G. Floyd, Syn. Fomes 247. 1915. Type not seen. Apparently a species of *Pyropolyporus.*

"Pileus ungulate, with a thin, pale, smooth, hard crust, variegated with darker spots. Context hard, dark brown (amber brown). Setae slender, numerous, dense. Spores hyaline, globose, 6 μ.

"I found this on the birch at Temagami, Ontario. It is closely related to igniarius and nigricans. The marked feature is the dense setae on the hymenium."

BROWNII. *Elfvingia Brownii* Murrill, Western Polypores 29. 1915. Found in California.

CAESIOSIMULANS. *Tyromyces caesiosimulans* Atk. Ann. Myc. **6**: 61. 1908. Said to be near *T. caesius,* but to have globose, pedicellate spores.

CALVESCENS. *Polyporus calvescens* Berk. Ann. Nat. Hist. **3**: 390. 1839. Described from New Orleans, Louisiana, and not since collected.

CARBONARIUS. See *Tyromyces carbonarius* Murrill in Western Polypores, p. 8.

CONFLUENS. *Polyporus confluens* (Alb. & Schw.) Fries. I have examined many specimens in herbaria and have studied fresh plants with Bresadola at Mendel Pass, but nothing I have seen from America seems to match it. It is pale-red at first, becoming almost as brilliantly colored as *Hypomyces lactifluorum.* Mr. Lloyd reports having seen a specimen from Massachusetts collected by Mrs. Blackford.

CONFUSUS. *Polyporus confusus* Mass. Kew Bull. **1910**: 250. 1910. Described from Louisiana. See "Southern Polypores," p. 22. Closely related to *Polyporus cyathiformis* Lév.

CONGLOMERUS. *Polystictus conglomerus* C. G. Lloyd, Myc. Notes 50: 706. *f. 1056*. 1917. Type not seen, but doubtless belongs in *Coriolus*.

"Pileus thin, rigid, developed from a hard, white, conglomerate, myceloid base. Surface unicolorous, between isabelline and honey yellow, velvety with soft hairs, faintly zoned. Pores minute, rigid, alutaceous. Spores 3 × 5, hyaline.

"The feature of this plant is the method of development from a conglomerate base, unknown to me in any other species. The rigid pileus and pores point to Trametes, but it is customary to refer such thin plants to Polystictus. In grouping it we would put the species in the same section as versicolor. The specimens were sent to Mr. Plitt by Dr. H. E. Hone from California."

CUTIFRACTUS. See *Tyromyces cutifractus* Murrill in Western Polypores, p. 7.

CYLINDRISPORA. *Poria* (or *Fomes*) *cylindrispora* C. G. Lloyd, Letter 65: 9. March, 1917. **Fomitiporia cylindrispora** (Lloyd) Murrill. Type not seen. Described from Weir's collection in Montana.

"Perennial, resupinate, ½–1 inch thick. Context ferruginous (about snuff brown Ridgway). Pores minute, with silvery glancing mouths. Pore layer narrow, 2–3 mm. wide. Setae abundant, slender, not inflated at base. Spores hyaline, cylindrical, 2½–3 × 6–7, smooth.

"Mr. Weir finds this abundant on Quercus Garryana. To the eye it is same as the common Poria punctata (Poria obliqua of American traditions, not Europe), but no other known similar species has cylindrical spores."

EPILEUCUS. Not American, so far as I know.

FARLOWII. *Polyporus Farlowii* C. G. Lloyd, Syn. Apus Pol. 363. *f. 697*. 1915. Type not seen. Apparently belongs in *Inonotus*.

"Pileus applanate, wavy. Surface strongly hispid, with suberect, brown hairs. Context hard, ferruginous, brown (antique brown), fibrillose. Pores small, round, firm, concolorous. Setae abundant, straight, projecting 30 μ. Spores colored, ellipitical, 2½ × 4½–5.

"The type at Kew was collected in Arizona and, according to the label, sent by Farlow to Cooke, who determined it as Polyporus endocrocinus. The yellow coloring matter is not soluble in water, but readily so in a potash solution. This must be an unusual species in our Western States. It has never reached us, nor is it found at New York."

FLORIFORMIS. Reported from America, but I have seen no American specimens that match those from Europe.

FRACTIPES. *Polyporus fractipes* Berk. & Curt. Grevillea **1**: 38. 1872. Collected a few times in South Carolina and Louisiana. *Polyporus humilis* Peck is closely related.

FRAGILIS. *Spongipellis fragilis* (Fries) Murrill, Southern Polypores 61. 1915. I have European specimens from Bresadola and Karsten and American specimens collected by Atkinson at Ithaca and in North Carolina, and by myself at Ohio Pyle, Pennsylvania, and at Lake Placid, New York. Fungi Columb. *4749*, collected at London, Canada, by Dearness, and distributed as *P. mollis* (Pers.) Fries is not distinct. Peck got it at Pine Hill, New York, and called it *P. Weinmanni* Fries. Compare Fries Icon. *pl. 182, f. 2*. My *Spongipellis sensibilis*, from the West, is closely related.

FUMIDICEPS. *Tyromyces fumidiceps* Atk. Ann. Myc. **6**: 61. 1908. Said to be near *T. chioneus*, but to have a darked pileus and very different spores.

GILVOIDES. *Trametes gilvoides* C. G. Lloyd, Myc. Notes 38: 520. *f. 516*. 1912. Collected by Lloyd on an oak branch in Florida in January, 1897, and never seen elsewhere by him. I have not seen the type, but it apparently belongs to *Pogonomyces*.

"Entire plant gilvous brown, pileus subresupinate, adnate, the surface of the pileus covered with rigid, brown setae in the same manner as those of *Trametes hydnoides*. Context gilvous brown. Hymenium with numerous slender setae of the "Hymenochaete" type. Pores small, round, with glancing mouths. Spores globose, 2½ × 3 μ, hyaline (or perhaps pale colored)."

GLOMERATUS. *Polyporus glomeratus* Peck, Ann. Rep. N. Y. State Mus. **24**: 78. 1873. **Inonotus glomeratus** (Peck) Murrill. Distinguished from *Inonotus radiatus* by its more resupinate habit and peculiar cystidia.

GRANTII. Polyporus Grantii C. G. Lloyd, Myc. Notes 53: 763. *f. 1147*. 1918. Type not seen.

"White, spathulate to a rooting base. Surface smooth, apparently a little glutinose when fresh. Context white, hard. Pores minute, white. Spores (if correctly seen) globose, 6–7 mic., minutely rough.

"Based on a single half specimen (62) from J. M. Grant, Washington. It grew on a log. At first I thought it was *Polyporus osseus*, one of our rare

species, which with us is usually greyish, but in Europe is white, but the spores of the two species are entirely different, if I see them correctly. The habitat also differs. When fresh the plant was probably slightly viscid as Abies needles are adherent to the surface."

HETEROMORPHA. *Daedalea heteromorpha* Fries, Obs. Myc. 1: 108. 1815. Overholts thinks we have this or a closely related species in America. He cites a specimen from Idaho with hymenium partly lamellate and partly poroid and spores cylindric, hyaline, 9–11 × 3–4 μ. Lloyd in Myc. Notes. 59, 1919, gives several figures of this plant, practically all of which show large, irregular pores like those of *Coriolellus sepium,* to which species I have been referring the above forms. According to Lloyd, his *Trametes lacerata* and *Coriolellus sepium* are both practically the same as *Daedalea heteromorpha.*

HISPIDELLUS. *Scutiger hispidellus* (Peck) Murrill, Western Polypores 16. 1915. It is quite distinct from *Scutiger radicatus* (Schw.) Murrill. I have recently received excellent specimens from the state of Washington. According to Lloyd, the species is not distinct from *Polyporus hirtus* Quél. of Europe. In support of his opinion, I find the dried specimens bitter, as described by Quélet; and it has been my experience that species occurring both in the northeastern United States and in the extreme Northwest are rather apt to be found also in Europe and around the world in northern regions. This distribution, of course, dates back to land connections and a different climate.

KREKEI. *Trametes Krekei* C. G. Lloyd, Letter No. 69: 12. 1919. Type not seen. Compare *Coriolellus serialis* and *Trametes Morganii.*

"Pileate with narrow pileate development, but very long, decurrent pores. Color pale reddish. Pores large, angular. Spores abundant, globose, 6 × 7 μ.

"The receipt of this fine specimen which was unfamiliar to me led to the study of the unnamed Trametes that have accumulated and the publication of *Trametes Morganii.* It is very similar to Morganii to the eye (but not the same), but the spores are entirely different. Rev. Kreke collected it in Franklin County, Indiana, and it must be rare, for I have no other specimen."

LEEI. *Inonotus Leei* Murrill, Western Polypores 21. 1915. Found on oak in California.

LUDOVICIANUS. *Inonotus ludovicianus* (Pat.) Murrill, Southern Polypores 41. 1915. On oak wood in South Carolina and Louisiana. It is a near relative of *Inonotus cuticularis.*

MALICOLA. *Trametes malicola* Berk. & Curt. Jour. Acad. Phila. II. 3: 209. 1856. **Coriolellus malicola** (Berk. & Curt.) Murrill. There are many dried specimens of this plant in the Garden herbarium which have seemed to connect up rather closely with small-pored forms of *Coriolellus sepium.* At Yama Farms, November 8, 1919, I collected several fresh specimens on apple-tree logs.

MCMURPHYI. *Polyporus McMurphyi* Murrill, Western Polypores 12. 1915. Found in California.

MERISMA. *Trametes merisma* Peck, Bull. N. Y. State Mus. 139: 31. 1910. Pendant from fallen beech trunks.

MORGANII. *Trametes Morganii* C. G. Lloyd, Letter No. 69: 15. 1919. This plant was incorrectly called *Trametes rigida* by Morgan. I have specimens of it, to which I several years ago assigned a manuscript name but never published it because it seemed to me too near to *Coriolellus serialis.* According to Lloyd, who describes it at length in the letter cited above, the same thing occurs under other names in Europe, where it is spore-bearing and always resupinate. He objects to Romell's name, *Polyporus albocarneogilvidus,* as being too long,—and one can hardly blame him.

OREGONENSIS. See *Scutiger oregonensis* Murrill in Western Polypores, p. 15.

OSSEUS. *Polyporus osseus* Kalchb. Enum 1, p. 160. Occasional northward. See "Western Polypores," p. 13.

OVINUS. *Polyporus ovinus* (Schaeff.) Fries. **Scutiger ovinus** (Schaeff.) Murrill. I have two American collections which I have referred to this species, one from Alabama sent by Dr. Burke, and one made by myself on a shady bank in coniferous woods at Camp Kanosa in the Adirondacks. The latter specimens were white beneath and pale-rosy-isabelline above, becoming rather gray in the herbarium and resembling *Scutiger griseus* (Peck) Murrill. *Scutiger Whiteae* Murrill is nearer *P. confluens.*

PENNSYLVANICUS. *Polyporus pennsylvanicus* Sumstine, Jour. Myc. **13**: 137. 1907. Reported also from Ohio and elsewhere, some of the specimens having been called *P. pallidus*. It has smaller scales than *P. caudicinus*.

PERDELICATUS. See *Tyromyces perdelicatus* Murrill in Western Polypores, p. 9.

PETERSII. *Trametes Petersii* Berk. & Curt. Grevillea **1**: 66. 1872. Described from Alabama and not since collected. See "Southern Polypores," p. 61.

PSEUDOTSUGAE. See *Tyromyces Pseudotsugae* Murrill in Western Polypores, p. 9.

PUSILLUS. *Trametes pusillus* C. G. Lloyd, Myc. Notes 54: 774. *f. 1165*. 1918. Collected in Minnesota by Dr. S. M. Stocker. Type not seen.

"Pileus small, 1–1½ cm., dimidiate, white. Margin acute. Surface dull, faintly greyish, unzoned, very minutely pubescent. Pores white, small, round, rigid, with white mouths. Cystidia none. Spores cylindrical, hyaline, smooth, $3 \times 6\,\mu$.

"When I first saw this collection I thought of *Fomes Ohiensis* (cf. Fomes Synopsis p. 218), but it did not look exactly right. The spores I found were entirely different. I do not know of any other species, excepting *Fomes Ohiensis* with which it can be confused. The pores are not in strata, hence these specimens are not Fomes, but the species may turn out to be a Fomes, the same as *Fomes Ohiensis*, which was thought at first to be a Trametes. The plant is quite close to a form of *Trametes sepium* we often find with little pilei, but its habits are different and its pores much smaller."

PUTEARIUS. *Fomes putearius* Weir, Jour. Agric. Research **2**: 163. *pl. 9*. 1914. Described from the Northwest on coniferous wood, with a preference for larch. I have before me specimens from Weir which appear to match in every particular specimens collected by Bresadola on fir near Trient and labeled "*Fomes spongiosus* Pers. (=*Fomes tenuis* Karsten)." Compare *Boletus spongiosus* Pers. Syn. Fung. 543 and *Boletus resupinatus* Bolton, Hist. Fung. 165. *pl. 165*. It is interesting to have this species so well worked up by Mr. Weir for America.

"Sporophores hard, woody, very irregularly lobed, recurving, slightly conchate to applanate, occasionally broadly spreading to typically resupinate. The resupinate sporophores are often a foot or more in length. Pileate forms 12

to 14 by 6 to 8 by 0.4 cm. The surface in young specimens is velvety or tomentose, later becoming slightly incrusted, but always more or less corky, zonate, much wrinkled and furrowed in old age, in color deep brown, becoming darker; margin lighter colored, undulate, tomentose, thin, with narrow sterile border when young, later becoming thickened, rounded, and recurved by the successive annual layers; context corky to woody, thick deep brown; tubes irregularly but distinctly stratified 2 to 3 mm. long each season, but much longer in resupinate forms, brown; mouths uniformly oval, varying in size, 4 to 8 to a millimeter, edges thick, ferruginous; spores colored, globose, smooth, 7 to 8 μ; spines dark brown, slightly ventricose 13 to 25 by 6 μ."

RIGIDUS. *Polyporus rigidus* Lév. Ann. Sci. Nat. III. **2**: 189. 1844. It is claimed that this Javan species, which somewhat resembles *Rigidoporus surinamensis,* occurs in Missouri and Florida. I have not seen the American collections upon which this claim is based.

SENSIBILIS. See *Spongipellis sensibilis* Murrill in Western Polypores, p. 10. Closely related to *Spongipellis fragilis* (Fries) Murrill.

SETOSUS. *Trametes setosus* Weir, Jour. Agric. Research **2**: 164. *pl. 10.* 1914. Described from Idaho on *Pinus monticola,* and said to be destructive to coniferous wood in the Northwest from Vancouver, B. C., to Montana. Compare small, poroid forms of *Porodaedalea Pini* (Thore) Murrill.

"Sporophores pileate or entirely resupinate, depending upon its position in the substratum. The resupinate forms have sharply defined sterile margins and are usually found on the underside of logs, where they may extend for a distance of a foot or more. The distinctly sessile pileate forms are usually free from each other, but may be connected by the resupinate portion, occasionally narrowed at the point of attachment, mostly thickened at the base, rarely applanate or conchate, averaging 1 by 2 by 2 cm. Surface minutely tomentose, becoming smooth or weathered in old specimens, zonate, rich dark brown, uneven; margin thick, of lighter color, entire, becoming slightly serrate in old age, slightly sterile; context ferruginous or fulvous, spongy to corky, slightly zonate, particularly in old specimens; tubes long, often filled with a grayish mycelium, 1 to 1.5 mm.; mouths small, mostly angular, occasionally labyrinth-like, 3 to 6 to a millimeter, edges thick, tomentose; spores hyaline, 4 to 5 by 3 μ. The character that distinguishes the species from all of its near relatives is the immense number of long dense brown setae lining the interior of the tubes. In no other species known to the writer is this character so distinctly pronounced. The longest spines measure 41.45 μ, the shortest about 22.16 μ, with an average of 30.46 μ. The nature and immense number of these setae may be determined by a study of Plate X, figure II."

SMARAGDINUS. *Polyporus smaragdinus* C. G. Lloyd, Myc. Notes 58: 818. *f. 1365.* 1919. Collected by Dr. J. F. Brenckle on a sycamore log in Arkansas. Type not seen.

"'Pileus dimidiate, 1–2 inches thick. Surface dull, uneven, with thin, buff cuticle. Context white, hard when dry. Pores minute, 4–6 mm. deep, with pale greenish tissue and brown mouths. Cystidia none. Spores globose, hyaline, 6 μ. Conidial spores abundant, small, subglobose, 2–3 μ, hyaline.

"The colors are those of the dried specimen. I judge that of the pore mouths has changed in drying. The pale green pore tissue is an unusual feature. I do not recall it in any other species."

SPUMEUS. This species has several times been reported, but I have seen no American specimens that correspond with those I have from Europe.

SUBPENDULUS. *Tyromyces subpendulus* Atk. Ann. Myc. **6**: 61. 1908. On hemlock; resembling *Porodisculus pendulus* in shape. Type not seen.

SUBSTIPITATUS. See *Tyromyces substipitatus* Murrill in Western Polypores, p. 9.

TEPHROLEUCUS. Reported from America, but I have seen no American specimens that correspond with European material.

TORULOSUS. *Fomes torulosus* Pers. Reported by Lloyd from Louisiana, growing on live oak. He says that *Fomes fuscopurpureus* Boudier, *pl. 152,* is the same thing and that the spores are hyaline. I have not seen the Louisiana specimens, unless they were some I determined for Edgerton as *Hapalopilus licnoides.* This species gets quite thick at times and appears to be perennial.

URSINUS. *Polyporus ursinus* C. G. Lloyd, Syn. Apus Pol. 319: *f. 659, 660.* 1915. Type not seen. Compare the description carefully with *Spongipellis fragilis* (Fries) Murrill.

"Pileus dimidiate (1 × 5 × 7 cm.), white, but turning reddish when bruised and on drying. Surface strongly scrupose, tomentose, with rigid, tufted hairs, which have the same color change as the flesh. Flesh white, soft when fresh, but drying firm and hard. Pores medium large, sinuate, white, discolored in drying. Spores narrow-piriform, tapering to the base, 2½ × 8–10.

"This we collected growing on pine at Temagami, Ontario, August, 1907. We referred it, from the description, with which it agrees exactly, to *Polyporus Weinmanni* of Europe, but we find the type of the latter plant at Kew is quite different, being *Polyporus mollis.* We think Professor Peck has col-

lected the same plant (cfr. Rep. 31) and also referred it to *Polyporus Weinmanni.*"

VARIIFORMIS. *Polyporus variiformis* Peck, Ann. Rep. N. Y. State Mus. **42**: 26. 1889. This was referred by me to *Coriolellus serialis* (Fries) Murrill, but some authors claim that it is distinct. I must look at Peck's types again.

VARIUS. *Polyporus varius* (Pers.) Fries. *Polyporus calceolus* (Bull.) Murrill, Bull. Torrey Club **31**: 41. 1904. Specimens collected in British Columbia by Macoun and at Clyde, New York, by O. F. Cook correspond very closely with specimens obtained by me in Sweden. In America, the species is rare and northern.

WASHINGTONENSIS. See *Coriolus washingtonensis* Murrill in Western Polypores, p. 4.

WEIRII. *Fomitiporia Weirii* Murrill, Mycologia **6**: 93. *pl. 122.* 1914.

ZELLERI. *Polyporus Zelleri* Murrill, Western Polypores 13. 1915. Found at Seattle, Washington.

ZONATUS. *Coriolus zonatus* (Fries) Quél. When I examined numbers of fresh and dried Specimens of this common European species several years ago, I did not feel justified in admitting it to our flora. I have since seen specimens from Canada and New England which approach it very closely.

NEW YORK BOTANICAL GARDEN.

NEW JAPANESE FUNGI

NOTES AND TRANSLATIONS—VIII

Tyôzaburô Tanaka

Phytophthora Carica (Hara) Hori ex K. Sawada in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. of Formosan Nat. Hist. Soc.) no. 26: 174–179. T. 5, xi, Nov. 1916. (Japanese.)

Kawakamia Carica Hara, Nôgyôkoku (Country of Agriculture) 9^3: 24–27. Mar. 1915; in Nippon Engei Zasshi (Journ. Hort. Soc., Japan) 30^4: 20–22. Apr. 1918.

Phytophthora Fici Hori, Byôchû-gai Zasshi (Journ. Plant Prot.) 2^{11}: 930–932. Nov. 1915.

Phytophthora Carica (Hara) Hori in Byôchû-gai Zasshi (Journ. Plant Prot.) 2^{12}: 1015–1017. Dec. 1915.

Phytophthora Carica Hara, K. Hara's Kwaju Byôgairon (A Discourse on Fruit Diseases) p. 431–436. Nov. 1916.

Phytophthora sp. Moeller in Bot. Mittheil. a. d. Tropen 9:3. 1901 (ex Sawada); Wilson in Mycologia 4^2: 77. 1914. (ex Sawada).

Aërial hyphae branching, thin-walled, continuous or septate at maturity, hyaline, 3–10 μ across; conidiophores solitary or fasciculate, much resembling aërial hyphae, simple or branching directly below the conidium, or irregularly forked, continuous or rarely septate, 36–480 μ long, seldom attaining to 1,000 μ, 3.5–4.5 μ across; conidia pyriform, oblong, ellipsoid, ovoid, or fusoid, bearing a distinct papilla 4–8 μ long, thin-walled, finely granulate, hyaline, 26–112 $\times$ 16–45 μ, wall contiguous to the end of conidiophores, often thickened, falling off at times with a part of conidiophore, germinating in water with germ tube or liberating zoöspores after 35 minutes; zoöspores several dozen from one conidia, ovoid or ellipsoid, ciliate at both ends, 12 $\times$ 8 μ, later transforming themselves into transparent, spherical resting-spores of 9–12 μ in diam., which also soon germinate with germ tube 3–4 μ across; germ tubes of conidia protrude usually from apical

papilla but occasionally from other part much branched, 4–10 μ across, often terminated by acrogenous secondary spore of the shape of conidia, otherwise a globe, which germinates with germ tube or produces zoöspores on germination; chlamydospores formed in the host tissue at ends of endogenous hyphae, seldom formed on conidiophores, globose, ochraceous, 15–49 μ, commonly 40–45 μ, wall at first thin, later thickened to measure 2 μ across; oögonia and oöspore yet unknown.

On *Ficus Carica,* causing white-rot (*Shiro-kusare* in Japanese) of fruits.

Type localities: Komaba, Tôkyô, College of Agriculture grounds, on "White Genoa," Sept. 1909, S. Kawagoe & K. Hara (ex Hara); Gumma-ken Agricultural Experiment Station grounds, on "Black California," Sept. 1915 (ex Hori).

Distribution: Taiwan (Formosa), also occurring on "Black California" (ex Sawada).

Hara states (in Kwaju Byôgairon p. 432) the disease commences in August or September. The fruit becomes darker in color and water-logged in appearance and is followed by immediate liquefaction and decay. The affection is at first limited to a small sunken area, but soon spreads over the entire fruit, developing in a few days a thick cottony cover of mycelium on its surface. A disagreeable odor usually accompanies the decay. The surface of rotten fruits remaining on the twig is white and longitudinally wrinkled in the dried condition.

Illustrations: Hara's Kwaju Byôgairon (p. 433) gives 8 woodcut figures illustrating the details of the fungus.

Notes: According to Hara's point of view, the genus *Kawakamia* ought to have its conidiophores unbranched or at least not branching immediately below the conidia (Hara '18 p. 22. See above). This distinction, however, is very uncertain and unreliable, as irregular branching of conidiophores is often observed in well established species of *Phytophthora, e. g. P. omnivora.* Sawada, dwelling upon *Kawakamia Cyperi* (Publication no. 102 of Agric. Exp. Stat., Taiwan, p. 10–18. June, 1916), rightly pointed out that the most important difference of *Kawakamia* from *Phytophthora* consists in having (1) well-developed haustoria and (2) its antheridia not tightly surrounding the oögonial

stalk, but simply attaching to the wall of oögonia at an arbitrary point, and (3) in its obligate parasitic nature. The conidium of *Kawakamia* is often reported to bear a collar cell at the basal end, but Sawada found this as a mere thickening of the wall, which is more prominent in *Kawakamia* than in *Phytophthora*.

CAPNODIUM TANAKAE Shirai and Hara sp. nov. in K. Hara's Kwaju Byôgairon (A discourse on fruit diseases) p. 239–242. T. 5, xi, Nov. 1916. (Japanese.)

Perithecia cylindric, simple or branched, with enlarged spherical apex containing asci, wall fungoid-parenchymatous in texture; asci clavate, tapering at both ends when fully matured, 6–8-spored, 30–45 × 10–12 μ; ascospores oblong or fusoid, not acutely pointed at both ends but rather blunt, 3-septate, fuscous, 10–15 × 4–5 μ.

Saprophytic on fruits of *Citrus grandis* (pummelo), forming irregular patches of thin felt of dirty blackish color, which only reflect the light slightly. In culture, hyphae and a form of conidia developed, which are not sufficiently worked out to prove whether they belong to a generation of this species or something else. Hyphae thus formed are at first whitish, then turn to the characteristic sooty color, plentiful, branching, septate, 3–5 μ across; upright hyphae resume a rôle of conidiophores, producing catenulate conidia at the end; conidia ellipsoid or ovoid, both ends rounded, smooth, continuous, 10–17 × 5–7 μ.

The crust is distinctly lighter in color than that of *Capnodium salicinum* and lacks the luster almost entirely. Microscopic characters are also distinct. No species resembling this has hitherto been described.

Illustrations: One woodcut and 1 black and white halftone figure showing the details of the fungus.

Note: The type material was collected by Tanaka at Kajiya, Yoshihama-mura, Kanagaa-ken, Nov. 7, 1909.

GLOEOSPORIUM FOLIICOLUM Nishida sp. nov. in T. Nishida's Shinpen Kankitsu no Byôgai to Yobôhô (A new discourse on citrus diseases and their protective measures) Tôkyô, p. 111–115. T. 3, xi, Nov. 1914. (Japanese).

Gloeosporium citricolum Hori in Kwaju (Fruit Tree) no. 123: 21. June, 1913; in Engei no Tomo (Friend of Horticulture) 9[7]: 627. Jul. 1913; in S. Hori's Shokubutsu Byôgai Kôwa (Lectures on plant diseases) 2: 113–114. Nov. 1916. *not* Massee.

Acervuli plentifully formed on upper surface of fallen leaves, also appearing in less amount on lower surface, scattered or more or less loosely gregarious, first subepidermal, later erumpent and raised, light reddish-brown, about 120 μ in diam., also occurring on young twigs and on fruits; conidiophores densely fasciculate, cylindric, subacutely tapering toward the apex, 2–3-septate, branching, hyaline, 36–48 $\times$ 4–5 μ, terminated by conidia; conidia cylindric, not curved, rounded at the apex, bluntly pointed at the base, hyaline, sparingly nucleate, 14–20 $\times$ 4–6 μ, germinating from either end.

On *Citrus* spp. particularly on Navel orange, Satsuma (*Citrus nobilis* var. *Unshiu*), and Natsu-daidai (Japanese summer orange resembling grape-fruit).

Localities: Prefectures Wakayama, Hiroshima; Islands Kyûshû, Taiwan.

Spots first appear on leaves in spring and summer as cloud-like irregular patches of somewhat dark color, which are indefinitely margined from the healthy part. Such leaves soon lose their vigor and defoliation immediately follows. Minute pinkish pustules then appear plentifully on the surface of fallen leaves. New shoots and fresh tips of the twig are also attacked, causing immediate change of color to yellowish-brown and finally to black, resulting in the entire death of that portion. On fruit, brownish spots are commonly met with, which soon develop pinkish pustules on the surface as in the case of the leaf.

Illustrations: 1 photograph (halftone) of badly damaged Satsuma plant at Wakayama prefecture (in 1911), and 1 woodcut showing a diseased leaf, conidiospores and conidia (both in Nishida l. c.).

Notes: In above cited literature Hori insists on the similarity of this fungus to *Gloeosporium citricolum* Massee, though it seems rather distinct in having branched conidiophores. Hemmi recently pointed out the parasitic nature of this fungus in Sapporo Nôrin Gakkwaihô (Journ. Soc. Agric. & Forestry, Sap-

poro) 10[46]: 239–282. Oct. 1918, while Sawada (in Taiwan Agr. Exp. Stat. Public. No. 100: 4. June 1916) and Hara (Discourse on fruit diseases p. 284. 1916) maintain their opinion that this is saprophytic. The disease is now widely spread all over Japan and Formosa causing annually somewhat notable damage to various kinds of Citrus, especially to Satsuma orange. Protective measures are also studied by local agricultural experiment stations, for instance Wakayama-ken prefectural station (*see* Progress Report for Fiscal Year Taishô 3, 1914, etc., etc.).

DACTYLARIA PANICI-PALUDOSI Sawada sp. nov. in Taiwan Hakubutso Gakkwai Kwaihô (Journ. of Formosan Nat. Hist. Soc.), no. 22: 78–80. T. 4, xii, Dec. 1915. (Japanese).

Foliicolous; spots at first orbicular, later forming fusiform areas of 5–23 × 2–4 mm., olivaceous-brown, then producing a gray or dark-colored, dusty substance which covers the lower surface, finally changing from the middle, into straw color; conidiophores fasciculate, simple or occasionally branched; curved near the apex, 1–3-septate, cinereous, 80–160 × 4–5 μ, bearing a few conidia, not more than 10; conidia oblong-ovoid to obclavate, obtuse at the apex, rounded or rostrate at the base, 2-septate, slightly constructed, hyaline or cinereous, 17–26 × 8.5–12 μ, average 22 × 10.2 μ, germinating in water in two hours, germ tube long, 2 μ in diam., never producing chlamydospores.

On living leaves of *Panicum paludosum*.

Type localities: Chônaihoshô, Taihoku-chô, Taiwan, Apr. 5 & Oct. 25, 1907, Suzuki; Aug. 13 & Nov. 16, 1908, Fujikuro; June 19, 1909, Sawada; Oct. 6, 1909, Fujikuro; May 16, 1910, Sawada; Sept. 23, 1910 & July 6, 1911, Fujikuro; Sept. 4, 1911, June 20, July 15, Aug. 7, 1914, & Nov. 21, 1915, Sawada: Kyûkô, Shinchiku-chô, Oct. 10, 1915, Sawada: Taichû, Taichû-chô, Oct. 11, 1913, Fujikuro; June 1, 1907, Suzuki: Tôseikaku, Taihoku-chô, June 3, 1907, Suzuki: Rinkiho, Kagi-chô, May 27, 1907, Suzuki: Kôshiken, Tainan-chô, Nov. 8, 1909, Sawada: Bokusekikaku, Kwarenkô-chô, May 12, 1909, & May 30, 1911, Sawada.

Notes: Differs from rice blast fungus in its short and broad conidia which usually have marked elongation of rostra at the base, and also producing no chlamydospore on germination. This fungus is unable to infect the rice plant by inoculation, just as rice

blast fungus does no injury to *Panicum paludosum*. Similar relation was also found true in case of the Dactylaria of *Panicum sanguinale*.

In a later article (Nôji Shikenjô Tokubetsu Hôkoku—Special Bull., Agr. Exp. Stat.—Taiwan, no. 16: 65–66. June 1917). Sawada revised the diagnosis in following points:

Young round spots measure 2–3 mm. in diam.; conidiophores slightly swollen near the base, bearing 1–10 conidia on alternately inflected apices, brownish-gray, decreasing in intensity toward the apex; conidia pyriform or elongated-pyriform, with collar cell of 1.7–2 μ diam., 17–28 $\times$ 8.5–12 μ average 22.5 $\times$ 10.2 μ, terminal cell 4–11 μ average 7.4 μ, central cell 5–8.5 μ average 7 μ, basal cell 6–10 μ, average 8.1 μ; diameter of germ tube 3–3.5 μ.

Two additional plates (black and white lithograph) illustrate conidiophores, conidia and the germination of conidia, and one woodcut figure (on p. 20) gives general appearance of an affected leaf.

DACTYLARIA LEERSIAE Sawada sp. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. of Formosan Nat. Hist. Soc.), no. 27/28: 252–253. T. 5, xii, Dec. 1916. (Japanese.)

Foliicolous; spots usually orbicular, 2–3 mm. in diam., or nearly fusiform, 5 $\times$ 2 mm., straw-colored at center, brown on margin; conidiophores fasciculate or solitary, simple, 2–3-septate, a little swollen near the base, alternately inflected at the apex, brownish-gray at the lower part, gradually becoming lighter toward the apex, 48–88 $\times$ 4–5 μ; conidia short-conic to elongate-conic, 2-septate, not constricted, rounded at the base which ends with a collar cell of 1.2–1.8 μ in diam., hyaline, 20–35 $\times$ 7–10 μ, average 27 $\times$ 8.6 μ, apical cell 6–13 μ, average 8.7 μ, central cell 7–12 μ, average 8.2 μ, basal cell 7–12 μ, average 9 μ, basal cell not sinuate toward the papilla; germ tubes 3–4 μ diam., septate, bearing acrogenous chlamydospores, chlamydospores cinereous, 9.5–12 $\times$ 9–10 μ.

On living leaves of *Leersia hexandra*.

Type localities: Chônaihoshô, Taihoku-chô, Taiwan, July 3, 1914, and Apr. 15, Dec. 4, 1915, and Aug. 18, 1916, Sawada; Shirin, Taihoku-chô, Sept. 23, 1916, Sawada.

Notes: Almost similar to rice blast fungus, only differing in (1) smaller collar cells which are attached to non-attenuated

base of conidia, (2) much larger chlamydospores, (3) less richly formed aërial hyphae in culture, and (4) when observed in culture distinctly more slender conidia with narrow basal cells. Hyphae of this species do not develop on bouillon-agar prepared with the extract of *Panicum paludosum*, while the rice blast fungus does very well on that medium. Inoculation failed on rice plant, just as the rice blast fungus has not been successfully transferred to *Leersia hexandra*.

Redescribing this species in Nôji Shikenjô Tokubetsu Hôkoku (Spec. Bull., Agr. Exp. Stat.), Taiwan, no. 16: 65 (June 1917), Sawada states that the spots are at first orbicular, 1–3 mm. in diam., then becoming angular, finally resuming fusiform shape. Illustration in black and white lithograph shows conidiophores, conidia, and germination of conidia in detail. Leaf spots are also shown in a text figure appearing on p. 21.

DACTYLARIA COSTI Sawada sp. nov. in Nôji Shikenjô Tokubetsu Hôkoku (Special Bull., Agr. Exp. Stat.), Taiwan, no. 16: 24–25, 66–67. T. 6, vi. June 1917. (Japanese.)

Spots usually occurring on leaves; small, orbicular, never becoming fusiform, 1–1.5 mm. in diam.; conidiophores fasciculate or solitary, simple, generally 2–3-septate, slightly swollen near the base, brownish-gray, becoming lighter toward the apex; conidia elongate-pyriform to clavate-fusoid, 2-septate, not constricted, both ends obtuse, often rounded at the base, with small collar cell of 1.5–1.7 μ in diam., hyaline, 20–30 $\times$ 7.5–10 μ average 24 $\times$ 8.6 μ, apical cell 8.5–12 μ, average 10.6 μ, other cells practically in equal length, basal cell not attenuated toward the papilla.

On living leaves of *Costus speciosus*.

Type locality: Chûho, Kagi-chô, Taiwan, Oct. 15, 1913, T. Kawakami.

Illustrations: One text figure (on p. 24) showing leaf spots, and one black and white lithographic plate giving detailed figures of conidia.

Note: In an elaborate article of Y. Nishikado in Ohara Nôgyô Kenkyûsho Hôkoku (Report of the Ohara Agricultural Institute) 1^2: 171–218, Dec. 1917, two more species of blast fungi found on *Setaria* spp. and on *Zingiber* spp. are described which are determined as spp. nov., *Piricularia Setariae* and *P. Zingi-*

beri respectively. It seems more likely that all these blast fungi belong to *Piricularia* rather than *Dactylaria,* as they are provided with solitary conidia which are produced at the end of more or less elongate, spike-like conidiophores, which can never be termed capitate, as was pointed out by Nishikado (l. c., p. 210). S. Ito, therefore, suggested the new combination of Sawada's three new species as *Piricularia Panicipaludosi, Piricularia Leersiae,* and *Piricularia Costi* (Bot. Mag., Tôkyô 32^{382}: 307–308. Japanese. Oct. 1918).

BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.

THE ALTERNATE STAGE OF PUCCINIASTRUM HYDRANGEAE[1]

J. F. Adams

Arthur (1) reports the genus *Pucciniastrum* as represented by nine species in *North American Flora*. At that time (1907) the aecial stage for none of the species was known in this country, and for only one of them in Europe. Since the publication of that part of the Flora two species have been connected with a *Peridermium* stage by American investigators, and one other, *P. sparsum* (Wint.) Ed. Fischer (3), by a European investigator.

In the summer of 1911 Fraser (4) was first to report successful inoculations in this country between the aecial stage of *Pucciniastrum pustulatum* (Pers.) Diet. on *Abies balsamea* and the telial stage on *Epilobium angustifolium*. In 1916 Weir and Hubert (6) reported successful inoculations of *Abies lasiocarpa* with telia of *Pucciniastrum pustulatum*. The aecial relationship had previously been established abroad by inoculations by Bubák, Fischer, Klebahn and Tubeuf (5).

Clinton (2) in 1910 was the first to report successful inoculations with the aecia of *Peridermium Peckii* Thüm., and established its relation with *Pucciniastrum Myrtilli*. Fraser in 1910 established the relationship between *Peridermium Peckii* and *Pucciniastrum minimum* (Schw.) Arth. Prof. C. R. Orton and the writer in 1914 successfully cultured *Peridermium Peckii* on *Azalea nudiflora, Vaccinium angustifolium* and *Gaylussacia* sp. These results indicate the relationship between these two forms of *Pucciniastrum* on Ericaceous hosts and are such that they may be identical.

The writer collected material of *Pucciniastrum Hydrangeae* (B. & C.) Arth. on *Hydrangea arborescens* L. at Bear Run, Lamar Gap, Clinton County, Pa., July 28, 1917, which is the first

[1] Contribution from the Department of Botany, Pennsylvania State College, No. 19.

collection reported for Pennsylvania. The leaves were heavily infected. Along a path for a distance of one fourth of a mile, the Hydrangeas and Hemlocks were quite numerous. The Hemlocks were infected with a *Peridermium,* which resembled *P. Peckii.* Additional material of the *Peridermium* stage was collected June 24, 1919. At this time the infection was just appearing on the first leaves of the new growth. Inoculations with this material was made the following morning in the greenhouse on *Hydrangea arborescens grandiflora* and *H. hortensis.* Two other species growing in the botanical garden were inoculated. *H. petiolaris* and *H. paniculata grandiflora,* as well as a species of *Vaccinium.* On July 7, 1919, mature uredinia were observed on the leaves of *H. arborescens grandiflora,* a sterile, cultivated form of the wild *Hydrangea arborescens* L. The results on the other plants were negative. A visit was made to Bear Run, July 17, 1919, when mature uredinia were found developing on the leaves of *Hydrangea arborescens.* An examination of the *Vaccinium* spp., and of *Agrimonia gryposepala,* in the vicinity failed to reveal any infection.

Compared with *Peridermium Peckii* this *Peridermium* shows a close similarity. The pycnia are not so large, and do not extend between the walls of the epidermal cells so deeply. Aecia when fresh are deep orange in color, and more elongated. The aeciospores are more uniformly ellipsoid, and more finely verrucose, than those of *P. Peckii.* On the basis of cultural relations a new combination is made. The morphological characters are such as to identify this form as a new *Peridermium* and the following new name is proposed to represent this in the form genus *Peridermium* with pycnia and aecia described as follows.

Peridermium Hydrangeae (Berk. & Curt.) comb. nov.

O. Pycnia amphigenous, usually hypophyllous, subcuticular, abundant, inconspicuous, flattened, 74–112 μ wide, 80–145 μ broad, 19–32 μ high, extending slightly between the lateral walls of the epidermis, frequently confluent.

I. Aecia hypophyllous, in two rows, cylindric, deep orange when fresh, 160–220 μ in diameter, 1–1.5 mm. high, dehiscent at apex, also sometimes by side slits; peridium colorless, with cells slightly overlapping, the outer walls thin, the inner walls finely

verrucose; aeciospores broadly ellipsoid, 10–19 by 19–32 μ; wall colorless, with an elongate spot smooth on one side, the remainder finely verrucose, thin, from 1–1.5 μ thick on smooth side to 3 μ on opposite side.

On *Tsuga canadensis* (L.) Carr. (*Pinaceae*), Bear Run, Lamar Gap, Clinton County, Pennsylvania, July 17, 1919, *J. F. Adams*. Specimens have been deposited in the herbaria of the New York Botanical Garden, Botanical Department of the Pennsylvania State College, and the Arthur Herbarium at Purdue University.

STATE COLLEGE, PA.

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3. **Fischer, Ed.** Cent. fur Bakt. **46**: 333, 1916.
4. **Fraser, W. P.** Cultures of Heteroecious Rusts Mycologia **4**: 4, 175–193, July, 1912.
5. **Sydow, P. & H.** *Monographia Uredinearum* **3**: 443, 1914.
6. **Weir, J. R. and Hubert, E. E.** A successful inoculation of *Abies lasiocarpa* with *Pucciniastrum pustulatum*. Phytopathology **6**: 373, 1916.

NOTES AND BRIEF ARTICLES

[Unsigned notes are by the editor]

Mr. W. S. Fields, formerly with the Bureau of Plant Industry in Mississippi as extension pathologist, has been appointed pathological inspector for the Federal Horticultural Board, and is at Washington, D. C.

Mr. G. F. Gravatt has returned to his position as assistant pathologist in the Bureau of Plant Industry, having recently been discharged from the Navy. He will work on the white pine blister rust and the chestnut bark disease.

Mr. A. H. Gilbert has entered the joint employ of the Vermont State Department of Agriculture and the Agricultural Experiment Station, with headquarters at Burlington. Until lately he held the position of extension pathologist for the Bureau of Plant Industry in Vermont.

Mr. A. C. Foster, formerly with the North Carolina Agricultural College as assistant in plant pathology, has been released from military service and has accepted a position at the Wisconsin Agricultural Experiment Station, Madison, Wisconsin, to investigate cucumber diseases.

Mr. W. A. McCubbin, formerly in charge of the Dominion Laboratory of Plant Pathology at St. Catherines, Ontario, has become deputy director of plant industry for the Pennsylvania Department of Agriculture at Harrisburg. He is located temporarily at Freeland, where he is assisting in the administration of quarantine regulations for restricting the spread of the potato wart disease.

A disease of Carolina poplar seedlings due to *Pleococcum populinum* is discussed by A. Bertin in *Vie Agr. et Rurale,* p. 292. 1918. The fungus enters readily through wounds, and may be controlled by spraying the young trees with Bordeaux mixture.

Citrus canker is reported by E. M. Doidge to occur in several places in South Africa, having been introduced from Japan on *Citrus trifoliata* stock. This most serious of citrus diseases has also appeared in Australia, the Philippines, and the Southern United States.

A popular sketch of the life and work of Elam Bartholomew appeared in the *American Magazine* for November, 1919, contributed by E. F. Tinker. A good photograph of Mr. Bartholomew, as he now appears at the age of sixty-six, accompanies the article.

The common field mushroom, *Agaricus campester,* was notably scarce last season in the vicinity of New York, doubtless owing to the unusually rainy weather. Did the mycelium fail to develop or did it develop so copiously that it failed to fruit? Were light and heat major or minor factors? It must be remembered that fungous mycelium requires oxygen just as any other growing plant.

A specimen of the rare *Anthurus borealis* Burt was brought in by Mr. Boynton on October 31, 1919, from the Gladiolus bed in the Garden grounds, where the students of the Garden School discovered it. This interesting stinkhorn is divided at the top into six narrow, hollow arms. It was first brought to our attention in May, 1911, by Dr. F. M. Bauer, who found it growing in quantity in mushroom beds on Blackwell's Island. So far as known, Mr. Boynton's specimen is the first ever collected within the New York Botanical Garden.

Gum formation in its relation to Cankers is discussed by Higgins in Bulletin 127 of the Georgia Experiment Station. The

author carried on a series of experiments in the artificial production of gummosis under partially controlled conditions and found that gum formation, although affected to some extent by variations in temperature, moisture, etc., is not dependent upon or always associated with growth activity. This behavior, together with the fact that a pectin-dissolving enzym is always found in freshly exuded gum, is held to indicate that gum formation is brought about by enzym activity.

A parasite of the tree fern, *Cyathea arborea,* causing black spots on the fronds, is described and handsomely illustrated by Stevens and Dalbey in *The Botanical Gazette* for September, 1919, under the name *Griggsia cyathea.* The genus as well as the species is new and belongs in the Dothidiales.

A long and abundantly illustrated article on the development of *Pluteus admirabilis* and *Tubaria furfuracea,* by Leva B. Walker, appeared in *The Botanical Gazette* for July, 1919. The material was collected at Ithaca and in the Adirondacks, and the investigation conducted at Cornell during the summers of 1916 and 1917 under the direction of Professor Atkinson.

Dr. E. P. Meinecke, of the Bureau of Forest Pathology in San Francisco, visited the Garden on December 22 to consult the mycological herbarium. He was especially interested in a specimen of *Peridermium* in the Ellis Collection, which was sent to Ellis many years ago from California by Harkness.

The influence of soil environment on root rot of tobacco caused by *Thielavia basicola* is discussed by Johnson and Hartman in the second number of the *Journal of Agricultural Research* for 1919. Saturated soils are favorable to the disease, but its occurrence is determined primarily by the soil temperature, the optimum ranging from 17 to 23° C. Acid fertilizers will not reduce infection, and fertilizers applied to heavily infested soils are largely wasted.

An excellent sketch of the life and work of Dr. Howard A. Kelly, of Baltimore, contributed by Dr. Thomas S. Cullen, with a bibliography of 485 titles prepared by Miss M. W. Blogg, appeared in *The Johns Hopkins Hospital Bulletin* for October, 1919. As Dr. Kelly is only about sixty and appears very much younger, we may expect many additions to his extended bibliography before it is ready for final binding.

An interesting and helpful bulletin by Jones, Miller, and Bailey on frost necrosis of potato tubers appeared in October, 1919, from the Wisconsin Agricultural Experiment Station. This injury is due not to solid freezing, after which the tubers collapse upon thawing, but to partial freezing that does not affect the tubers externally. When cut open, however, characteristic discolorations appear, which might easily be attributed by the uninitiated to the attack of some fungus.

Those interested in mosaic diseases, which are quite in the public eye at this time, will welcome an article by Schultz and others in the *Journal of Agricultural Research* for September 15, 1919, dealing with potato mosaic. The article was read in manuscript at the conference of potato pathologists on Long Island last June. There are several illustrations, some of which are in natural colors.

"The Farmers' Dictionary and Household Cyclopedia," by the late Dr. George Thomas Surface, formerly on the Yale University Staff, has just been published in a limited edition by the author's father, Rev. F. D. Surface, of Blacksburg, Virginia. It is a handbook of 730 pages with up-to-date information on practical farming and domestic science arranged in alphabetical order for the use of farmers and their wives. As the facts are mostly taken from agricultural publications, a copy of this work would no doubt prove very valuable and handy in any agricultural experiment station. It is splendidly written, well printed, and costs little.

A fresh young specimen of *Ganoderma sulcatum* Murrill was collected by Dr. and Mrs. Pennell, November 22, 1919, on a trunk of *Sabal Palmetto* on the Isle of Palms, Charleston County, South Carolina. Several large specimens were seen at the time, similar to one brought in from the same locality in February, 1916, by Dr. Small. This species was described in 1902 from specimens collected in Florida by Mr. C. G. Lloyd. It seems to be confined to the palmetto and is known only from Florida, Georgia, and South Carolina. Mr. W. H. Long found it several times in Florida. The single Georgia collection was made by Mr. R. M. Harper in 1903 near Thalmann, in Glynn County.

The nematode disease of wheat in Virginia is treated by F. D. Fromme in Bulletin 222 of the Virginia Agricultural Experiment Station under date of August, 1919. This disease is already widespread in the state, being known from 33 counties. Its presence may be recognized by the wrinkling and distortion of the leaves of the young wheat plants, by the abnormal appearance of the heads, and by the occurrence of hard, brown galls in the heads in place of the grains of wheat. It may be prevented by the use of clean seed and crop rotation.

ERGOT ON PASPALUM

Last fall, especially during the latter part of October, ergoty *Paspalum* was extremely common in the vicinity of Fayetteville, Arkansas. Specimens were also received from other localities in the state. The grayish-white sclerotia corresponded to the descriptions of these bodies on this host genus. However, it was not ascertained whether the fungus was *Claviceps Paspali* Stevens & Hall or *C. Rolfsii* Stevens & Hall. Dr. F. L. Stevens, in correspondence, writes that it is necessary to germinate the sclerotia in order to determine the species of *Claviceps* involved; apparently the sclerotia of the two species are very similar and the differences between the two species are only to be observed in the fruiting heads which bear the asci.

Stevens and Hall (Bot. Gaz. **50**: 460. 1910) list two species of *Paspalum* as hosts for these fungi, *P. laeve* and *P. dilatatum*. Brown and Ranck (Miss. Agr. Exp. Sta. Bul. 6, 1915) added *P. distichum*. *P. laeve* was very commonly infected in this region and also *Paspalum floridanum* Michx., a host species not previously reported, was found to bear similar sclerotia. It is interesting to note that attacked spikelets fall with the pedicels attached to them, in contrast to the fall of normal spikelets in which the pedicels remain attached to the rachis.

H. R. ROSEN.

FUNGI FROM HEDGCOCK

A number of boxes of polypores collected by Hedgcock, Long, Humphrey, Weir, Hartley, and others, in various parts of the United States were sent in some time ago from the Division of Forest Pathology for identification and verification, and duplicates were added to our herbarium. The collection contained many interesting specimens. A partial report follows:

Fomes putearius Weir from the Northwest, on *Abies, Picea, Pinus,* etc. Compare *Fomes spongiosus* of Europe.

Funalia stuppea from various localities, chiefly on *Populus.*

Hapalopilus gilvus from California, on oak.

Hapalopilus licnoides from Georgia, on bald cypress. This may be what was recently reported as *Fomes torulosus.*

Inonotus dryadeus from Washington, on *Tsuga heterophylla.* This was collected several times by Humphrey. I have it also from Oregon on this host and on *Abies grandis.* It is difficult to believe until one has seen the specimens that this oak-loving species occurs on conifers.

Inonotus dryophilus from Arizona, on *Populus.*

Pyropolyporus Bakeri from Texas, on oak.

Spongipellis borealis from Vermont, on sugar maple.

Spongipellis fragilis from Pike's Peak, Colorado, 11,000 ft. elevation, on *Pinus flexilis.*

Trametes Morganii? of Lloyd from Maryland, on *Liriodendron.*

Trametes robiniophila? from Texas, on oak. The specimen is old and discolored.

Tyromyces guttulatus from Idaho, on *Pinus Murrayana*.

W. A. MURRILL.

COLLECTING FUNGI AT YAMA FARMS

Yama Farms is a vast tract of virgin land lying twenty miles due west of Poughkeepsie among the foothills of the Catskill Mountains. It is a beautiful natural asylum for wild life of all kinds and will doubtless remain so for many years to come. Authors, musicians, artists, naturalists, and other lovers of nature from all parts of the country find their way to this quiet resting-place at every season of the year and return to their homes greatly refreshed and more deeply impressed with the abundance and charm of nature's offerings.

On November 7, 1919, I went up to Yama in company with Mr. H. I. Miller and the following day we covered about one hundred miles by motor, visiting the most inviting localities and collecting all the larger fungi to be found. Beginning at Jenny Brook, famous for its trout, we worked southward past Ellenville and into the hills to the west before noon. In the afternoon, we drove twenty-eight miles in a northwesterly direction up the valley of Lackawack Creek and turned northward through a virgin forest lying in the edge of Sullivan County. Here among the hemlocks, yellow birch, beech, and other characteristic Catskill and Adirondack trees we found a rich collecting ground and obtained many interesting specimens. At the height of the collecting season, this would be a veritable paradise for mycologists.

The trip was not without interest, also, to the botanist of less specialized tastes; for mosses, ferns, rhododendron, and kalmia covered the rocks and banks everywhere, while climbing bittersweet and holly brightened the swamps and hedgerows with their orange and scarlet berries.

The result of our day's collecting can hardly be given in a brief article. Mr. Miller and I went through the specimens and

named and listed them systematically, recording nearly a hundred distinct species. Of course, most of the fleshy forms had been killed by the heavy frosts, but we obtained enough of these for luncheon next day, when twenty-three guests were served from a dish consisting chiefly of *Hypholoma perplexum, Pleurotus ostreatus, Pleurotus serotinus,* and *Collybia velutipes.*

The two species of *Pleurotus* were found mostly on sugar maple trees along the roads, while the *Collybia* grew on fence posts and stumps. *Pleurotus serotinus* can not be recommended, owing to its slimy character, but we were compelled to use it as a "filler."

Among discoveries of special scientific interest, I might mention *Spongipellis fragilis* and *Fomitiporia tsugina,* on hemlock; *Polyporus admirabilis* and *Coriolellus malicola,* on apple; *Daedalea quercina,* on butternut; *Fomes ungulatus,* on a chestnut stump; and *Pyropolyporus igniarius* and *Spongipellis galactinus,* abundant in apple orchards. Two or three new species were probably discovered, among them a beautiful clustered *Stropharia.*

The affinities of the fungi found are with those of the Catskill region, which was visited by the author in August, 1916. For a list of the species collected at that time in the vicinity of Arkville, see *Mycologia* for November, 1916.

I am deeply indebted to Mr. Seaman, Mr. Miller, and Mrs. Sarre for this opportunity of visiting Yama Farms and enjoying its hospitality and natural treasures.

W. A. MURRILL.

MEETING OF THE CANADIAN BRANCH OF THE AMERICAN PHYTOPATHOLOGICAL SOCIETY

The first annual meeting of the Canadian Branch of the American Phytopathological Society was held at the Ontario Agricultural College, Guelph, Ontario, December 11th and 12th.

Canadian Phytopathologists were well represented at this meeting. Among those taking active part in the proceedings were: Dr. A. H. R. Buller, University of Manitoba; Dr. J. H. Faull, Toronto University; Mr. P. A. Murphy, Dominion Laboratory of

Plant Pathology, Charlottetown, P. E. I.; Mr. W. H. Rankin, St. Catharines; Mr. W. P. Fraser, Saskatoon, Sask.; R. J. Blair, Forest Products Laboratories, Montreal; Mr. F. L. Drayton, Central Experimental Farm, Ottawa; Professor L. Caesar, Professor J. E. Howitt and Dr. R. E. Stone, Ontario Agricultural College.

The President, Professor J. E. Howitt, in his address dealt with what should be the aims of this Society. These, briefly summarized, are as follows:

First—To provide adequate facilities for the training of research men in Plant Pathology in Canada.

Second—To make provision for the publication in Canada of the results of scientific investigations in Plant Pathology not of interest to the general public.

Third—To make available to the general public the practical application of results obtained from scientific research in Plant Pathology.

Fourth—The unification of recommendations made by the various pathologists regarding the control of the more common diseases.

Fifth—The carrying out of a plant disease survey to secure information concerning the financial losses caused by disease to Agriculture and Forestry and the distribution of plant diseases throughout Canada.

Sixth—The adoption of a standard of qualifications required of men entering the field of Plant Pathology in Canada.

Seventh—The appointment of an advisory board to confer with the Federal and Provincial authorities regarding plant quarantine and other restrictive legislation.

Eighth—The maintaining of a bibliography of Canadian Plant Pathology.

Dr. E. C. Stakman of the University of Minnesota was a guest of the Canadian Branch and dealt with the Cereal Rust problems in the United States and Canada.

The papers on the following programs were given at this meeting:

PROGRAM

President's address ..... J. E. Howitt
Health and Disease in Plants ..... F. L. Drayton
Decay in the Timber of Pulp and Paper Mill Roofs... R. J. Blair
(Illustrated with lantern slides.)
Butt Rots of the Balsam Fir in Quebec Province..... W. H. Rankin
Leaf Blight of the White Pine ..... J. H. Faull
Pseudorhiza of Certain Saprophytic and Parasitic
Agaricinae. (Illustrated.) ..... A. H. R. Buller

EVENING PROGRAM

Address of Welcome ..... President G. C. Creelman
Address ..... Dr. E. C. Stakman
Education of Plant Pathologists.
Discussion led by ..... Dr. J. H. Faull

PROGRAM

Witches'-Broom of the Canada Balsam and the alternate hosts of the causal organism..... R. E. Stone
Some comparative observations upon the shape of Basidia and Method of spore Discharge in the Uredineae and Hymenomycetes. (Illustrated with models and lantern slides.)..... A. H. R. Buller
Smut of Western Rye Grass ..... W. P. Fraser
Address ..... E. C. Stakman
Some observations made in inspecting for Leaf Roll and Mosaic of Potatoes ..... J. E. Howitt
New or Little-known diseases of potatoes which cause the running out of seed..... P. A. Murphy
Breeding Beans for Disease Resistance..... G. P. McRostie
Combination sprays for Apple and Potato. (By title.). G. E. Sanders
Some Data on Peach Yellows and Little Peach..... L. Caesar
Fungi New to Ontario..... A. W. McCallum
Some Fungi and Plant Diseases comparatively new to Ontario ..... R. E. Stone and J. E. Howitt

The following officers were elected for 1920: President, Dr. A. H. R. Buller; Vice-President, Dr. J. H. Faull; Secretary-Treasurer, Dr. R. E. Stone.

Additional Members of the Council: Professor J. E. Howitt and Mr. F. L. Drayton.

R. E. STONE

TRAMETES SERPENS

This species was first described by Fries in 1818 under *Polyporus,* then transferred to *Daedalea* in 1821, and finally to *Trametes* in 1874. In the "Systema," the following description of it appears:

"D. *serpens,* effusa, suberoso-tenuis, confluens, ligneo-pallens, margine villoso, poris magnis inaequalibus.

"Color D. quercinae. Margo tenuis, pubescens. Sinulorum dissepimenta crassa. Inter corticis rimas per lineas elongatas seriatas & confluentes serpit. *Ad truncos Quercus mortuos, sed non prostratos!*"

This description was well supplemented by Fries in his Icon. *pl. 192, f. 3,* which shows the characteristic, large, unequal pores, over 1 mm. in diameter. The spores are said to be ovoid, hyaline, $14 \times 6 \mu$, and no mention is made of setae. I have examined specimens in the various European herbaria and have in the collection here an excellent specimen from Bristol, England, sent by Massee. The conclusion I reached at Upsala in 1906 was: "All the *Trametes serpens* found in Europe is entirely different from what goes by this name in America. The pores are larger and are all different."

When collecting in Cuba, I found the American plant very abundant, and it is surprising that it does not appear prominently in the list of Cuban fungi collected by Wright. The only description in this list that seems to fit it is of *Polyporus excurrens (Wright 391),* collected once in April on the underside of old logs and described by Berkeley and Curtis as

"Totus resupinatus, immarginatus, lignicolor; poris mediis subangulatis demum sinuosis, dissepimentis crassiusculis obtusis acie subtiliter tomentosis. Pores $\frac{1}{60}$ inch in diameter."

The type of this species was not found by me at Kew, and the brief description alone would hardly justify a positive statement regarding its identity. I have asked Miss Wakefield to look up the type.

In the "Ellis Collection," many specimens are found collected in Florida, where this species seems to be unusually abundant on various kinds of dead deciduous wood. These specimens are

sometimes called *Trametes serpens* Fries and sometimes *Polyporus Stephensii* Berk. & Br., an identical European species described from plants collected by Stephens on privet twigs near Bristol, England, in 1847.

The American plant ranges northward into South Carolina and southward to Brazil, showing considerable variation in the size, shape, and obliquity of its tubes, which are always smaller, however, and otherwise distinct from those of the true European *T. serpens*. The following collections I have examined will indicate the distribution:

Ellis & Ev. N. Am. Fungi *1707;* Rav. Fungi Am. *112;* Rav. Fungi Car. **4**: *7;* South Carolina, *Ravenel;* Louisiana, *Langlois 1612, 2512, 2559;* Florida, *Calkins 47, 51, 60, 68, 116, 130, Lloyd 2129, Ravenel, Rolfs 7, Mrs. Russell, Small & Mosier 5407;* Cuba, *Earle 1591, Earle & Murrill 117, 124, 144, 148, 152, 200, 305, 321, 459, 475, 476;* Jamaica, *Earle 469, Murrill & Harris 1020;* Porto Rico, *Stevens 8988;* St. Thomas, *Raunkiaer 180;* Mexico, *Murrill 642, Smith 205;* Colombia, *Baker;* Bolivia, *Bang 2310;* Brazil, *Möller.*

There has come to me recently from the Philippine Islands a specimen named *Elmeriana setulosa* (P. Henn.) Bres., which seems to match very closely our American plant. Another Philippine specimen named *Poria straminea* Bres. does not appear to be distinct from *E. setulosa* except in the obliquity of its tubes. A fine Philippine collection made by Mr. Williams, however, differs from both the above in its much larger and more shallow pores, suggesting in their size the plant with which we began this discussion, but evidently much more American than European in its affinities.

W. A. MURRILL.

THE GENUS PORIA

The name *Poria* was used generically by Dr. John Hill in his "History of Plants," published in 1751, to include certain large pileate species such as *Fomes Laricis* and *Fistulina hepatica.* On page 28, the genus was described as follows:

"Poria is a genus of Fungus's growing horizontally, but having its underside not formed into lamellae, but full of little holes or pores . . ."

Adanson (Fam. **2**: 10. 1763) based his genus *Poria* on Mich. *pl. 61. f. 2.* 1729, a polynomial and as yet undetermined species, citing *A. porosum* Brown in support of his use of the name. His treatment was similar to that of Hill, since it included only pileate forms.

This historical use of *Poria* was followed until the time of Persoon, who properly established the genus and included in it resupinate species only, without reference to previous usage.

PORIA Pers. Neues Mag. Bot. **1**: 109. 1794

Physisporus Chev. Fl. Par. **1**: 261. 1826.

Hymenophore resupinate, epixylous, perennial, inseparable, rigid; context thin, white; tubes white, becoming stratified after a year or more; spores hyaline.

Type species, *Poria medullapanis* (Jacq.) Pers.

This genus was founded upon three species, *P. medullapanis, P. salicina,* and *P. fimbriata,* the last two of which are generically distinct from the first. *Physisporus* was based on nine species, the first accompanied by the citation of a figure being *P. medullapanis.*

PORIA MEDULLAPANIS (Jacq.) Pers. Neues Mag. Bot. **1**: 109. 1794

Boletus medullapanis Jacq. Misc. Austr. 141. *pl. 11.* 1778.
Polyporus pulchellus Schw. Trans. Amer. Phil. Soc. **4**: 158. 1832.
Polyporus dryinus Berk. & Cooke; Berk. & Curt., Grevillea **6**: 130. 1878.
Poria tomento-cincta Berk. & Rav.; Cooke, Grevillea **15**: 26. 1886.
Poria holoxantha Berk. & Cooke; Cooke, Grevillea **15**; 26. 1886.

Jacquin gave a fairly good and complete description of the plant, with a poor figure. It is no wonder that Fries could not interpret this description, since he had probably never seen the plant. I have seen only one specimen of it from Sweden. Persoon, on the other hand, had a considerable number of specimens in his herbarium and it is to him that we must look for the true idea of the species.

Bresadola saw Persoon's specimens and knew the plant well in its various stages, as found abundantly in central and southern Europe on dead wood of oak, aspen, ash, cherry, olive, etc. He describes it as follows:

"Species haec, omnium comunissima in Europa media, videtur in Suecia deesse, nam neque in Herbario Friesii, neque in collectione Romell inveni. Perennans est, stratosa, poris angulatis, mediis, integris, saepe obliquis; sporis obovatis, uno apice truncatis, hyalinis, 5–6.5 × 5.5–5 μ, una alterave etiam subangulato-polygonali; hyphis subhymenialibus, 1.5–2 μ."

According to Schroeter, the spores are 4.5 × 3–4 μ and the species occurs on both deciduous and coniferous wood the whole year through. I have not seen specimens taken from coniferous wood either in this country or in Europe.

In America, there has been considerable confusion regarding this species. Schweinitz called it *P. obducens* because it was stratose; Morgan associated it with *P. xantholoma* because it was often yellow; and Ellis named his specimens *P. obducens, P. vulgaris, P. pulchella,* etc., according to the vagaries of Cooke and his other advisers.

And there is more than one good reason for this confusion. When I compared our American specimens with those of Persoon, I could hardly believe they were the same species; and it required a close study of hundreds of specimens from various regions and different hosts to connect up the series satisfactorily. This is often the case, however, with species so widely distributed, since there is every reason for them to vary widely.

I have on the table before me several specimens from Bresadola. The thin forms of one or two years' growth agree perfectly with the types of *P. pulchella* and other large-pored forms found especially on oak in America. A fine collection from Tolland, Colorado, is eminently typical of the European plant. The older, stratose specimens from Bresadola, however, agree with the older specimens found abundantly in New York and New Jersey on fallen branches of various kinds, which in their early stages appear quite distinct from the European forms that I have seen. Morgan describes this young stage as follows:

"P. xantholoma, Schw. Widely effused, closely adnate, even, smooth, dry; the border rather broad, velvety, yellowish. Pores minute, unequal, subrotund, obtuse, pale yellowish.

"Common in woods. Effused often to the extent of many inches or even several feet on the underside of sticks or smaller branches lying somewhat up from the ground and keeping dry. The border is sometimes 'elegantly luteous' and therefore of a deeper yellow than the pores but this is not always the case. The pores at first are pale, maturing into a rich cream-color; they are mostly roundish but vary to oblong and subsinuous; the dissepiments are thick and obtuse; they average .16 mm. in diameter."

A more complete description accompanies a collection made by Overholts on elm logs in Ohio in 1911, which includes both young and old stages:

"Effused, irregular, firm and rigid, perennial, 6–8 mm. thick; margin thin, narrow, adnate, tomentose; hymenium plane or convex, even, white, pallid or yellowish in old specimens, with a slight silky sheen on some specimens; mouths circular, thick-walled, entire; tubes 1–2 mm. long each season, white within; spores elliptical, smooth, hyaline, 4.5–5.5 × 2.7–4.5 μ."

Allowance must always be made for weathering, exposure to light, obliquity of tubes, condition and character of substratum, etc. If one finds a conspicuous species of Poria on an old, exposed, decorticated locust or chestnut post, it is pretty apt to be this species, which is by no means choice but is very common and widely distributed in America on dead wood of oak, chestnut, black locust, poplar, beech, witch hazel, dogwood, sassafras, maple, mulberry, elm, tulip, ash, and probably other deciduous trees. *P. albo-incarnatus* Pat. & Gaill., from Venezuela, and *P. vitellinulus* P. Karst., from Finland on alder, do not appear to be distinct. Among the great number of collections examined, the following will serve to indicate its distribution in this country.

Ellis & Ev. N. Am. Fungi *503, 3409;* Ellis & Ev. Fungi Columb. *402;* Rav. Fungi Car. **3**: *12;* Canada, *Dearness, Macoun 151;* Rocky Mountains, *Macoun 532;* Maine, *Murrill 1787;* New Hampshire, *P. Wilson;* Connecticut, *Underwood;* New York, *Atkinson* (Cornell Univ. Herb. 8254, 8279), *Brown 135, Dodge & Seaver, Fairman, Livingston & Crane, Murrill 2709, Underwood 308, P. Wilson;* New Jersey, *Ellis 3844, P. Wilson;* Pennsylvania, *Banker, Haines & Everhart, Jackson 25, Murrill 1020, 1045, 1070,*

Sumstine 3, 13, 30, 43, 45, 57; Delaware, *Commons 2294, 2343;* District of Columbia, *Sheldon 73;* Virginia, *Long, Murrill 217, 240, 353;* West Virginia, *Hartley 49, Nuttall;* Ohio, *Fink 54, James, Lloyd 2794, 3135, Morgan 88, 601, Overholts 172, 216;* Kentucky, *McFarland 168;* Illinois, *Calkins;* Indiana, *Underwood, VanHook 2171, 2194, 2436, 2566, 2587, Weir 55;* Tennessee, *Murrill 599;* Michigan, *Kauffman 1;* Montana, *Anderson 130;* Iowa, *Holway, G. W. Wilson, 1, 2, 3, 6;* Colorado, *Bethel, Demetrio, Seaver & Bethel;* Kansas, *Cragin 110, 557;* Arkansas, *Long 19851;* New Mexico, *Hedgcock & Long 9908;* Arizona, *Long 19725, 21373, 21394, 21395;* California, *Johnston 258;* North Carolina, *Murrill, Bartholomew 5661;* South Carolina, *Ravenel;* Georgia, *Ravenel;* Alabama, *Underwood;* Mississippi, *Tracy 185;* Louisiana, *Earle 10, Langlois;* Florida, *Calkins 31, 88, 119, 142, 921, Lloyd 2078, Mrs. Russell;* Cuba, *Britton & Wilson 5463;* Mexico, *Murrill 625, 626, 688, 690, Smith 42;* British Honduras, *Peck.*

W. A. MURRILL.

COLLECTING FUNGI NEAR WASHINGTON

The first two weeks in October, 1919, were spent by the writer in the vicinity of Washington, with excursions to Falls Church, Fairfax Court House, Great Falls, and Mount Vernon in Virginia; and to Baltimore, Reisterstown, and Easton in Maryland. Dr. Howard A. Kelly collected with me one afternoon near Falls Church, securing several specimens of fleshy fungi which he took home and had photographed or painted.

I went with a party of friends over some of the golf links in the suburbs of Washington and found the common field mushroom, the field puffball, the fairy ring mushroom, and a peculiar, large form of *Collybia radicata* which grew only under maple trees. All of these were eaten and enjoyed.

Clitocybe illudens was abundant in oak woods, particularly fine clusters being observed west of Falls Church and near the boat landing at Mount Vernon.

The journey to Easton, located on the Eastern Shore of Maryland over eighty miles from Washington, was especially interesting because Miss Mary E. Banning, a pioneer mycologist of

Maryland, was born in Talbot County. Dr. Kelly is preparing an account of her life and work. Her book of manuscript and drawings is at Albany, having been donated by her to the State Museum about thirty years ago. A list of the species she collected, comprising fourteen that were new, was published by Dr. Peck in his 44th annual report.

A day and night were spent at the home of Dr. Kelly in Baltimore, where Mr. L. C. C. Krieger, a botanical artist of great ability, is busily engaged in preparing illustrations of the fleshy fungi.

W. A. MURRILL.

THREE NEW FUNGI FROM PORTO RICO

The following fungi were collected by me in Porto Rico in 1913, 1914, and 1915, and were given to Mr. Lamkey to study. The descriptions and names were supplied by him.

Microstroma ingaicola Lamkey, sp. nov. Basidia clavate, 16–29 μ long, emerging through stomata in a crowded head; sterigmata minute; spores 4–8, hyaline 2–3 by 6–8 μ.

Producing witches' broom on *Inga laurina*. Mayaguez, Jan. 1914. No. 6711. The witches-brooms produced were large and numerous and quite as conspicuous as the brooms usually present on the hackberry in the states.

Microstroma pithecolobii Lamkey, sp. nov. Basidia clavate, 20–24 μ long, emerging through stomata in a crowded head; sterigmata minute; spores usually 8, hyaline, 2 by 8–10 μ.

Producing white hypophyllous spots on *Pithecolobium saman*. Mayaguez, Dec. 1913. No. 6734. The spots on the lower sides of the leaves were of the appearance of a Ramularia. The host was recently imported into Porto Rico and all of the planting was heavily infected though the fungus was not found on any of the other species of Pithecolobium so common on the island.

Peronoplasmopara portoricensis Lamkey, sp. nov. Conidiophores emerging through stomata, singly or in twos or threes, 80–300 by 5½–11 μ, pseudo-monopodially 3–5 branched, ultimate branches tapering and 9–18 μ long; conidia ellipsoid, hyaline, 14–24 by 16½–28 μ. Oöspores not present.

Forming irregular downy hypophyllous spots on *Melia azedarach*. Guanica, 1914. No. 6852. Florida Adentro No. 7687, 1915. This downy mildew was first collected in very scant quantity, on only a few small leaves near Guanica. The second collection, however, from a distant point on the island was ample, nearly all of the leaves of the tree being mildewed. The fungus is of especial interest since but few of the downy mildews grow on trees.

F. L. STEVENS.

AN EARLY AMERICAN RECORD OF MUSHROOM POISONING

There is an early record of mushroom poisoning in the old graveyard at Piscataway, near New Brunswick, New Jersey, which has not, so far as the writer is aware, been brought to the attention of mycologists interested in this matter. The record is in the form of an inscription on a tombstone and reads, as follows:

SPATATERS · VNDER ·
NEATH · THIS · TOMB ·
LIES · 2 · BOYES · THAT ·
LAY · IN · ONE · WOMB ·
THE · ELDEST · WAS · FVLL ·
13 · YEARS · OLD · THE · YON ·
GEST · WAS · V · TWICE ·
TOLD · BY · EATING ·
MVSHROOMS · FOR ·
FOOD · RARE · IN · 1 · DAYS ·
TIME · THEY · POYSEONED ·
WERE · RICHARD · HOOPAR
AND · CHARLES · HOOPAR ·
DESESED · AVGVST · ANNO ·
DOM. 1695

The stone is a flat sandstone slab, about two and one-half by five feet in size. It is now badly weathered and promises to be-

come illegible in a few years. The first word is probably intended for "Spectators."

Both the deadly amanita, *Venenarius phalloides,* and the fly agaric, *Venenarius muscarius,* are extremely common in the vicinity of New Brunswick, but while in most localities the former is more abundant, in and around the old graveyard at Piscataway the fly agaric seems to be much commoner than its relative, suggesting that this species was the "food rare" which caused the untimely death of the two unfortunate youths and furnished the inspiration for the unknown epitaph writer.

GEORGE W. MARTIN.

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